IN THE CLAIMS:

Please AMEND claims 1, 3, 6, 11, 12 14 and 16, as follows.

1. (Currently Amended) A positioning apparatus comprising:

a movable member movable in a first direction; and

an electromagnet unit configured and positioned to drive said movable member in the first direction, wherein said electromagnet unit comprises:

a first electromagnet; and

a second electromagnet positioned away from said first electromagnet in a second direction which is perpendicular to the first direction,

wherein said first electromagnet and said second electromagnet are positioned at a same side of said movable member, and

wherein each of said first electromagnet and said second electromagnet is controlled to generate a magnetic flux having an inverted polarity with respect to the other, and a leakage flux of said first electromagnet is canceled by a leakage flux having the inverted polarity of said second electromagnet, and a suction power generated by said first electromagnet and a suction power generated by said second electromagnet are applied to drive said movable member in a same direction.

2. (Original) The positioning apparatus according to claim 1, further comprising current control means for applying currents of inverted polarities having substantially a same value to a

first coil and a second coil so as to generate magnetic flux of different polarities in said first electromagnet and said second electromagnet, said first coil wound around a core constituting said first electromagnet and said second coil wound around a core constituting said second electromagnet in a same direction as the first coil.

3. (Currently Amended) The positioning apparatus according to claim [[1]] 2, wherein in a case when currents of a uniform polarity having substantially a same value are applied to ~~the~~ said first coil and ~~the~~ said second coil, a coil winding direction of ~~the~~ said first coil wound around ~~the~~ said core constituting said first electromagnet is opposite to a coil winding direction of ~~the~~ said second coil wound around ~~the~~ said core constituting said second electromagnet.

4. (Original) The positioning apparatus according to claim 1, wherein said movable member comprises:

a movable core portion configured with a magnetic material, which forms magnetic paths respectively between said first electromagnet and said movable core portion, and said second electromagnet and said movable core portion; and

a supporting member configured with a nonmagnetic material, which supports said movable core portion.

5. (Previously Presented) The positioning apparatus according to claim 1, wherein said electromagnet unit further comprises a third electromagnet positioned away from said second electromagnet in the second direction,

wherein said third electromagnet is controlled to generate a magnetic flux having the same polarity as the magnetic flux generated by said first electromagnet and having a polarity inverted with respect to the polarity of the magnetic flux generated by said second electromagnet.

6. (Currently Amended) The positioning apparatus according to claim 5, further comprising current control means, wherein said current control means applies currents to respective coils of said first electromagnet, said second electromagnet and said third electromagnet at a ratio of 1:2:1, and

wherein the leakage flux of said first electromagnet and a leakage flux of said third electromagnet are canceled by the leakage flux having the inverted polarity of said second electromagnet, and the suction power generated by said first electromagnet and the suction power generated by said second electromagnet and a suction power generated by said third electromagnet are applied to drive said movable member in the same direction.

7-8. (Cancelled)

9. (Original) The positioning apparatus according to claim 1, comprising a plurality of electromagnet units, having said first electromagnet and said second electromagnet, for driving

the stage in X-axis, Y-axis and Z-axis directions and a rotational direction around respective axes.

10. (Previously Presented) The positioning apparatus according to claim 9, further comprising a carriage stage for carrying said apparatus on an XY plane.

11. (Currently Amended) A charged-particle beam exposure apparatus comprising:

a charged-particle source for irradiating a charged-particle beam;

a first electron optical system, having a plurality of electron lenses, for forming a plurality of intermediate images of the charged-particle source by the plurality of electron lenses;

a second electron optical system for projecting the plurality of intermediate images, formed by said first electron optical system, on a substrate; and

a positioning apparatus, holding the substrate, for driving a stage to a predetermined position to perform positioning of the stage, wherein said positioning apparatus comprises:

a movable member movable in a first direction; and

an electromagnet unit configured and positioned to drive said movable member in the first direction, wherein said electromagnet unit comprises:

a first electromagnet; and

a second electromagnet positioned away from said first electromagnet in a second direction which is perpendicular to the first direction,

wherein said first electromagnet and said second electromagnet are positioned at a same side of said movable member, and

wherein each of said first electromagnet and second electromagnet is controlled to generate a magnetic flux having an inverted polarity with respect to the other, and a leakage flux of said first electromagnet is canceled by a leakage flux having the inverted polarity of said second electromagnet, and a suction power generated by said first electromagnet and a suction power generated by said second electromagnet are applied to drive said movable member in a same direction.

12. (Currently Amended) A device manufacturing method comprising:

a step of installing a plurality of semiconductor manufacturing apparatuses, including a charged-particle-beam exposure apparatus, in a factory; and

a step of manufacturing a semiconductor device by using the plurality of semiconductor manufacturing apparatuses,

wherein the charged-particle-beam exposure apparatus comprises:

a charged-particle source for irradiating a charged-particle beam;

a first electron optical system, having a plurality of electron lenses, for forming a plurality of intermediate images of the charged-particle source by the plurality of electron lenses;

a second electron optical system for projecting the plurality of intermediate images, formed by said first electron optical system, on a substrate; and

a positioning apparatus, holding the substrate, for driving a stage to a predetermined position to perform positioning of the stage, wherein said positioning apparatus comprises:

a movable member movable in a first direction; and

an electromagnet unit configured and positioned to drive said movable member in the first direction, wherein said electromagnet unit comprises:

a first electromagnet; and

a second electromagnet positioned away from said first electromagnet in a second direction which is perpendicular to the first direction,

wherein said first electromagnet and said second electromagnet are positioned at a same side of said movable member, and

wherein each of said first electromagnet and said second electromagnet is controlled to generate a magnetic flux having an inverted polarity with respect to the other, and a leakage flux of said first electromagnet is canceled by a leakage flux having the inverted polarity of said second electromagnet, and a suction power generated by said first electromagnet and a suction power generated by said second electromagnet are applied to drive said movable member in a same direction.

13. (Cancelled)

14. (Currently Amended) A positioning apparatus comprising:

a first member;

a second member having at least two sets of electromagnet units, wherein each of the electromagnet units has two electromagnets arranged on each side of said first member in a way to sandwich said first member while maintaining a predetermined gap in a first direction; and

a controller which controls current flow to each of said electromagnet units to drive said first member relative to said second member in the first direction,

wherein ~~said electromagnet units~~ the two electromagnets are arranged away from each other in a second direction which is perpendicular to the first direction,

wherein the two electromagnets are positioned at a same side of said first member, and

wherein each of the two electromagnets is controlled to generate a magnetic flux having an inverted polarity with respect to the other, and a leakage flux of one electromagnet is canceled by a leakage flux having the inverted polarity of the other electromagnet, and suction powers generated by the two electromagnets are applied to drive said first member in a same direction.

15. (Previously Presented) The positioning apparatus according to claim 14, wherein said controller controls the current flow to generate magnetic fluxes of different polarities in the electromagnets.

16. (Currently Amended) A charged-particle-beam exposure apparatus comprising:

exposure means for exposing a pattern onto a substrate;

a stage configured to mount the substrate and position the substrate based on a motion of a first member driven by a positioning apparatus, wherein the positioning apparatus comprises:

said first member;

a second member having at least two sets of electromagnet units, wherein each of the electromagnet units has two electromagnets arranged on each side of said first member in a way to sandwich said first member while maintaining a predetermined gap in a first direction; and

a controller which controls current flow to each of said electromagnet units to drive said first member relative to said second member in the first direction,

wherein ~~said electromagnet units~~ the two electromagnets are arranged away from each other in a second direction which is perpendicular to the first direction,

wherein the two electromagnets are positioned to the same side of said first member, and

wherein each of the two electromagnets is controlled to generate a magnetic flux having an inverted polarity with respect to the other, and a leakage flux of one electromagnet is canceled by a leakage flux having the inverted polarity of the other electromagnet, and suction powers generated by the two electromagnets are applied to drive said first member in the same direction.